

REMARKS

Claims 21, 24-36, 38-39 and 41-43 are currently pending in this application, with claims 21, 35, and 39 being the only independent claims. Dependent claims 22, 23, 37 and 40 have been canceled. Independent claim 21 has been amended to incorporate the subject matter of canceled dependent claims 22 and 23. Independent claim 35 has been correspondingly amended to incorporate the subject matter of canceled dependent claims 22, 23 and 37. Independent claim 39 has been correspondingly amended to incorporate the subject matter of canceled dependent claims 23, 37 and 40. No new matter has been added. Reconsideration of the above-identified application, in view of the following amendment and remarks, is respectfully requested.

Claims 21-27 and 35-40 stand rejected under 35 U.S.C. §102(b) as unpatentable over U.S. Pub. No. 2003/0172654 ("*Lawheed*") in view of U.S. Patent No. 4,429,661 ("*McClure*"). Claims 28-34 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Lawheed* in view of *McClure* and WO 85/02881 ("*Lipovetz*"). For the following reasons, reconsideration and withdrawal of these rejections are requested.

Independent claim 21 has been amended to incorporate the subject matter of dependent claims 22 and 23. Thus, independent claim 21 now recites the step of "condensing the expanded working fluid in a heat exchanger and injecting at least a portion of the condensed working fluid into the roots blower during the expansion of further working fluid". Independent claims 35 and 39 have been correspondingly amended. The combination of the cited art fails to teach or suggest this limitation.

The Examiner (at pg. 3 of the Final Office Action) assert that:

Lawheed discloses an engine 42 with rotors 100 forming a roots blower with double lobes in figure 6, an evaporator 26, and a condenser 46 ... [and that]... McClure discloses it's well known to use triple-blades roots blower 60, 140, in a heat plant with an evaporator 120.

Applicants, however, respectfully disagree that the combination of *Lawheed* and *McClure* provides a method of converting heat energy generated in an evaporator to mechanical energy by expanding an evaporated working fluid that includes “condensing the expanded working fluid in a heat exchanger and injecting at least a portion of the condensed working fluid into the roots blower during the expansion of further working fluid”, as now recited in independent claim 21.

Lawheed merely teaches that gaseous working fluid, i.e., a “gas discharge”, is applied to the engine 42 through a gas discharge tube 40 (see paragraph [0057]; Figs. 1 and 2). *Lawheed*, however, fails to teach or suggest that liquid fluid is fed to the engine 42. Particularly, no condensed working fluid is applied to the engine 42 of *Lawheed*. More importantly, *Lawheed* fails to teach or suggest the injection of a liquid. Thus, *Lawheed* can not disclose, teach or suggest the expressly-recited step of “condensing the expanded working fluid in a heat exchanger and injecting at least a portion of the condensed working fluid into the roots blower during the expansion of further working fluid”. Indeed, the Examiner has failed to cite any specific section of *Lawheed* that purportedly teaches the claimed injecting at least a portion of the condensed working fluid into the roots blower, as recited in now-amended independent claim 21 (as formerly recited in dependent claim 23 (now canceled)).

McClure, on the other hand, merely discloses a compressor 60, 140 which is fed by a flue 138 from a pressurized receiver tank 148 (see col. 8, lines, 36-40). In the *McClure* arrangement, cooling water of a water jacket 166 is only located outside the compressor 60, 140. There is no cooling water inside the compressor 60, 140 (see col. 8, lines 50-66). Thus, *McClure* teaches that only a gaseous flow is fed to the compressor 60, 140. There is no teaching or suggestion in *McClure* that a liquid is supplied to the compressor 60, 140. More particularly, no condensed working fluid is applied to the compressor 60, 140 of *McClure*, and no liquid is injected into the compressor. *McClure* likewise can not disclose, teach or suggest the claimed step of “condensing the expanded working fluid in a heat exchanger and injecting at least a portion of

the condensed working fluid into the roots blower during the expansion of further working fluid” as recited in now-amended independent claim 21.

Since the cited art merely describes roots blower compressors that convey gases, the skilled person would not apply a fluid to the compressors described in, for example, *Lawheed* and *McClure*, absent some explicit hint or reason to do so. Particularly, *Lawheed* and *McClure* fail to provide the slightest hint, teaching or suggestion that injecting liquid working fluid into a roots blower could increase the effectiveness of a thermodynamic cycle. Moreover, the skilled person would expect that feeding a fluid to a compressor would harm a compressor, since a compressor is simply not a pump. The skilled person would typically know to prevent the presence of liquids within a compressor and would not attempt to increase the presence of liquid within a compressor. Independent claim 21 is therefore not rendered obvious and unpatentable by the combination of *Lawheed* and *McClure*.

Independent claims 35 and 39 include similar limitations and should be allowable for at least the same reasons as is independent claim 21. For example, the skilled person would have no reason to provide a heat exchanger configured to inject at least a portion of condensed working fluid into the roots blower during the expansion of further working fluid and, thus, the skilled person would not provide an injection opening for enabling such an injection of at least a portion of the condensed working fluid into the roots blower. Independent claims 35 and 39 are therefore not rendered obvious and unpatentable by the combination of *Lawheed* and *McClure* for *at least* this additional reason.

The Examiner has acknowledged that the combination of *Lawheed* and *McClure* fails to teach or suggest an “absorbent step”, as recited in dependent claims 28-34, and cites *Lipovetz* for this feature.

Applicants, however, respectfully disagree that the combination of *Lawheed*, *McClure* and *Lipovetz* achieves a method for converting heat energy generated in an evaporator to

mechanical energy that includes injecting at least a portion of the condensed, expanded and evaporated working fluid into the roots blower during the expansion of further working fluid, as recited in now-amended independent claim 21. *Lipovetz* discloses a system for converting heat energy of the environment connected to a heat energy source. The disclosure of *Lipovetz* includes two drawings, i.e., Fig. 1 and Fig. 2. There is nothing whatsoever in Fig. 1 and Fig. 2 of *Lipovetz* regarding the condensing step that including the injection of at least a portion of the condensed, expanded and evaporated working fluid as recited in now-amended independent claim 21. The combination of *Lawheed*, *McClure* and *Lipovetz* thus fails to teach or suggest applicants' claimed low-pressure expansion device that is a roots blower in which the condensing step of now-amended independent claim 21 is performed, because *Lawheed*, *McClure* and *Lipovetz* make no mention whatsoever of injecting at least a portion of condensed, expanded and evaporated working fluid into a roots blower. Applicants accordingly assert that dependent claims 28-34 are therefore patentable based on their dependency from independent claim 21.

Reconsideration and withdrawal of the rejections under 35 U.S.C. §103 are therefore in order, and a notice to that effect is respectfully requested.

In view of the patentability of independent claims 21, 35 and 39, dependent claims 24-26, and 38-39, as well as new dependent claims 41-43, are also patentable over the prior art for the reasons set forth above, as well as for the additional recitations contained therein.

Based on the foregoing remarks, this application is in condition for allowance. Early passage of this case to issue is respectfully requested.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,
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